CLAIMS:

1. A method for determining surface topology of a portion of a three-dimensional structure, comprising:

(a) providing an array of incident light beams propagating in an optical path leading through a focusing optics and through a probing face; the focusing optics defining one or more focal planes forward said probing face in a position changeable by said optics, each light beam having its focus on one of said one or more focal plane; the beams generating a plurality of illuminated spots on the structure;

(b) detecting intensity of returned light beams propagating from each of these spots along an optical path opposite to that of the incident light;

(c) repeating steps (a) and (b) a plurality of times, each time changing position of the focal plane relative to the structure;

(d) for each of the illuminated spots, determining a spot-specific position, being the position of the respective focal plane yielding a maximum measured intensity of a respective returned light beam; and

(e) generating data representative of the topology of said portion.

2. The method according to Claim 1, wherein the plurality of incident light beams are produced by splitting a single parent beam.

3. The method according to Claim 1, wherein step (a) comprises polarizing the incident light beams.

4. The method according to Claim 3, wherein step (b) comprises filtering light having polarization same as the incident light and measuring light of opposite polarization.

5. The method according to any one of Claims 1-4, wherein each of said beams is composed of at least two light components different in at least one parameter.

6. The method according to Claim 5, wherein said at least one parameter is selected from the group consisting of wavelength, phase, light pulse duration and pattern.

7. The method according to Claim 5, comprising. in step (b), determining intensity independently for each of said at least two light components in the return light beams.

8. The method according to Claim 7, wherein each of said at least two light components focuses in a plane differently distanced from the sensing surface.

9. The method according to any one of Claims 1-8, wherein the data representative of said topology is used for constructing an object to be fitted within said structure.

10. The method according to any one of Claims 1-9, wherein the data representative of said topology is converted into a form transmissible through a communication medium to recipient.

11. The method according to any one of the preceding claims, wherein said structure is a teeth segment.

12. The method according to Claim 12, wherein said structure is a teeth segment with at least one missing tooth or a portion of a tooth and said object is said at least one missing tooth or the portion of the tooth.

13. A method for reconstruction of topology of a three-dimensional structure comprising:

(i) determining surface topologies from at least two different positions or angular locations relative to the structure, by the method defined in any one of Claims 1-12;

(ii) combining the surface topologies to obtain data representative of said structure.

14. The method according to Claim 13, for reconstruction of topology of a teeth portion, comprising:

- determining surface topologies of at least a buccal surface and a lingual surface of the teeth portion;
- combining the surface topologies to obtain data representative of a three-dimensional structure of said teeth portion.

15. The method according to Claim 14, for obtaining data representative of a three-dimensional structure of a teeth portion with at least one missing tooth or a portion of a tooth.

16. The method according to Claim 15, wherein said data is used in a process of designing or manufacturing of a prostheses of said at least one missing tooth or a portion of a tooth.

17. The method according to Claim 16, wherein said prostheses is a crown or a bridge.

18. An apparatus for determining surface topology of a portion of a three-dimensional structure, comprising:

- a probing member with a sensing face;
- an illumination unit for providing an array of incident light beams transmitted towards the structure along an optical path through said probing unit to generate illuminated spots on said portion ;
- a light focusing optics defining one or more focal planes forward said probing face at a position changeable by said optics, each light beam having its focus on one of said one or more focal plane;
- a translation mechanism for displacing said focal plane relative to the structure along an axis defined by the propagation of the incident light beams;

- a detector having an array of sensing elements for measuring intensity of each of a plurality of light beamsreturning from said spots propagating through an optical path opposite to that of the incident light beams;
- a processor coupled to said detector for determining for each light beam a spot-specific position, being the position of the respective focal plane of said one or more focal planes yielding maximum measured intensity of the returned light beam, and based on the determined spot-specific positions, generating data representative of the topology of portion.

19. The apparatus according to Claim 18, wherein said illumination unit comprises a source emitting a parent light beam and a beam splitter for splitting the parent beam into said array of incident light beams.

20. The apparatus according to Claim 19, wherein said illumination unit comprises a grating or microlens array.

21. The apparatus according to any one of Claims 18-20, comprising a polarizer for polarizing said incident light beams are polarized.

22. The apparatus according to Claim 21, comprising a polarization filter for filtering out from the returned light beams light components having the polarization of the incident light beams.

23. The apparatus according to any one of Claim 18-22, wherein the illumination unit comprises at least two light sources and each of said incident beams is composed of light components from the at least two light sources.

24. The apparatus according to Claim 23, wherein the at least two light sources emit each a light component of different wavelength.

25. The apparatus according to Claim 24, wherein said light directing optics defines a different focal plane for each light component and the detector independently detects intensity of each light components.

26. The apparatus according to Claim 23, wherein the at least two light sources are located so as to define optical paths of different lengths for the incident light beams emitted by each of the at least two light sources.

27. The apparatus according to any one of Claims 18-26, wherein said focusing optics operates in a telecentric confocal mode.

28. The apparatus according to any one of Claims 18-27, wherein said light directing optics comprises optical fibers.

29. The apparatus according to any one of Claims 18-28, wherein said sensing elements are an array of charge coupled devices (CCD).

30. The apparatus according to Claim 29, wherein, said detector unit comprises a pinhole array, each pinhole corresponding to one of the CCDs in the CCD array.

31. The apparatus according to any one of Claims 18-30, comprising a unit for generating data for transmission to CAD/CAM device.

32. The apparatus according to Claim 31, comprising a communication port of a communication medium.

33. The apparatus according to any one of Claims 18-32, for determining surface topology of a teeth portion, comprising an optical probing memeber for placing proximal to the teeth.